

CMDS Database Users Guide

The CMDS Database holds diverse information about experiments. It contains parameter information such as values, alarm limits, and sensors used to sample the parameter data. It contains information about the experiment apparatus, the start and end date of the experiment, and who was conducting the experiment. It contains information about when the equipment was last calibrated and what instrument was used in calibration. The database also contains information about any anomalies that occurred during the experiment in the way of alarms indicating the parameter values were not in accordance with the experiment design. The database also allows the parameter data to be statistically processed for inclusion in a report generated at the end of the experiment. It allows manual data entry as well as automatic entry by the equipment controllers. Comma delimited data such as spreadsheet data can also be processed and entered into the database using the *Process Source File* utility.

The *Support Codes* menu (shown in Figure 1. Support Codes) consist of tables that hold information that is used by other tables in the database. The codes are established once and used many times forcing consistency as they are selected instead of entered where used. Most of these tables are created by engineering support personnel, but the Personnel table will be updated by any user of the system as it contains personnel contact data such as phone numbers and email addresses for alarm notification.

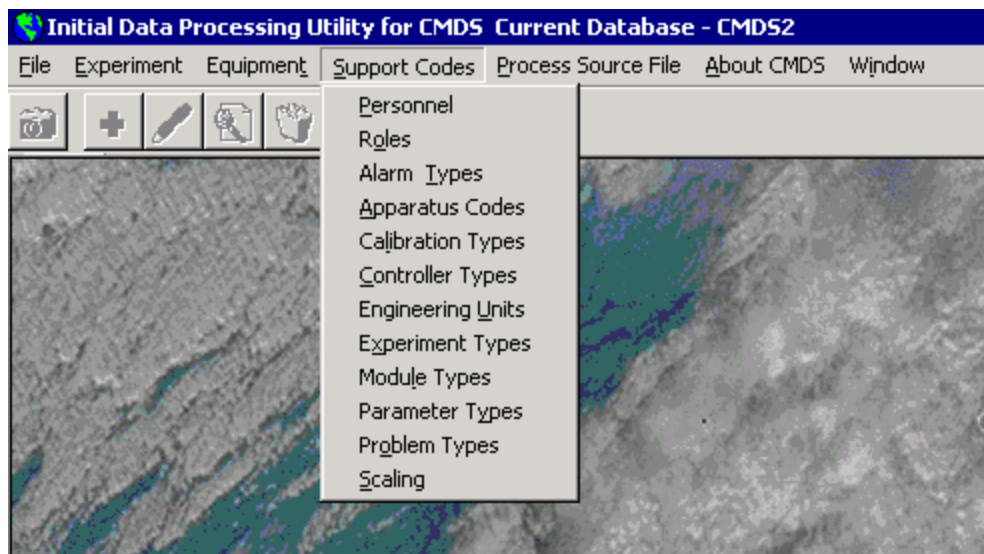


Figure1. Support Codes

The Equipment menu (shown in Figure 2. Equipment) has entry screens for the various apparatus that are used to conduct the experiment organized as a parent apparatus and child apparatus showing the organization of the experiment equipment. Information about experiment controllers, modules that are plugged into the controllers and sensors that are attached to the modules are also entered into the system using screens provided for that purpose. These screens are used by engineering support personnel.

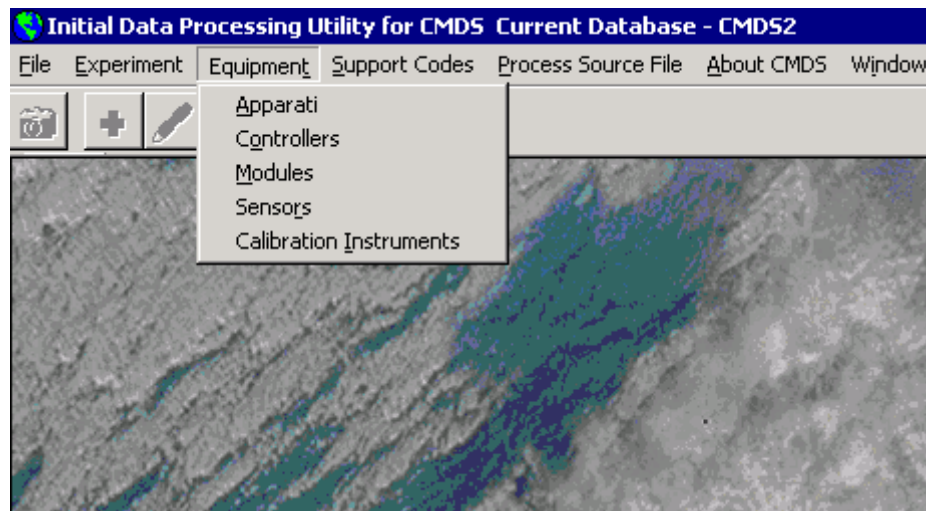


Figure 2. Equipment

The *Experiment* menu (Figure 3.Experiment) has the experiment input screens, parameter definition screens, alarm configuration screens and manual data entry screens. These are the forms that will be used most by the Principal Investigators and their staff.

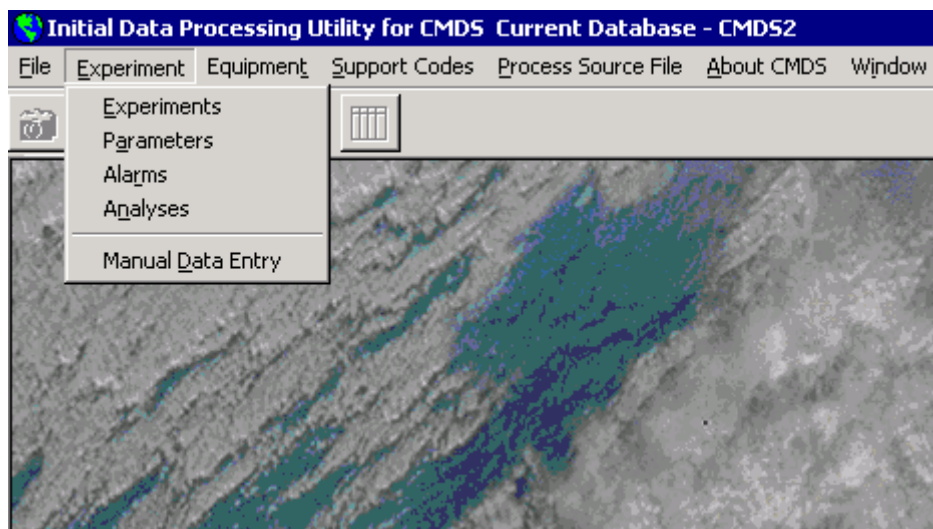


Figure 3. Experiment

Selecting *Experiments* from the menu brings up a list of experiments that have been entered into the database. Selecting an entry and right clicking provides a popup menu as shown in Figure 4. Experiments Menu. The options provided are to view an entry, edit an entry, add an entry or delete an entry.

Experiment							
	Experiment Identifier	Mission Identifier	Experiment Study Title	Experiment Type	Experiment Program	Start Date	End Date
1	ENV041		ENVIRONMENTAL BASELINE TEST OF ALS "SALAD" CROP	PHYTOTRON		1/14/2004	2/18/2004
2	ENV041B		ENVIRONMENTAL BASELINE TEST OF ALS "SALAD" CROP	PHYTOTRON		3/3/2004	4/7/2004
3	ENV042		ENVIRONMENTAL BASELINE TEST OF ALS "SALAD" CROP	PHYTOTRON		1/28/2004	3/3/2004
4	ENV043		ENVIRONMENTAL BASELINE TEST OF ALS "SALAD" CROPS	PHYTOTRON		4/14/2003	5/19/2004
5	ENV044B		Environmental Baseline Test of ALS "salad" crop hydroponic tests at 28 degree C and 1200 ppm CO2	PHYTOTRON		8/11/2004	9/15/2004
6	ENV045B		Environmental Baseline Test of ALS "salad" crop hydroponic tests	PHYTOTRON		9/15/2004	10/20/2004

Total Records: 21 Displayed Columns: 7 of 7

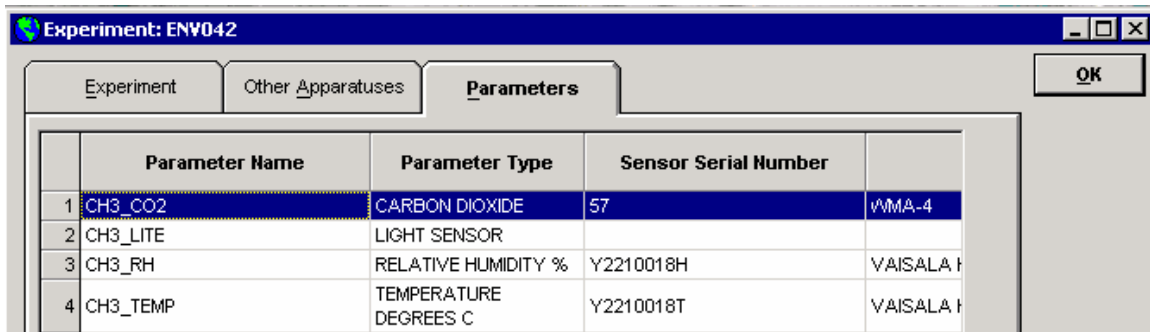
Figure 4. Experiments Menu

Selecting *Add* provides a blank Experiment Entry Form. Shown in Figure 6. Experiment Form is an example of a filled in form that would be seen by selecting *View* from the menu.

Experiment: ENV042		OK
Experiment	Other Apparatuses	Parameters
Experiment Identifier:	ENV042	
Mission Identifier:		
Study Title:	ENVIRONMENTAL BASELINE TEST OF ALS "SALAD" CROP	
Environmental Setpoints:	Hydroponic tests at 4000 ppm CO2	
Principal Investigator:	SHARON EDNEY	
Experiment Type:	PHYTOTRON	
Experiment Program:		
Start Date:	28-Jan-2004	Start Time: 00:00
End Date:	03-Mar-2004	End Time: 00:00
Instructions:	PHOTOPERIOD 0800/2400 TEMP C 25/25 RH% 50/50 PPF 450/150 (LIGHT TYPE CWF) CO2 4000 SOLUTION PH 5.8 SOLUTION EC 1200	
Primary Apparatus:	CHAMBER 3	

Figure 5. Experiment Entry Form

Selecting the *Parameters* Tab brings up the form shown in Figure 6. Experiment Parameters Form. This shows the parameters that have been assigned to this experiment.

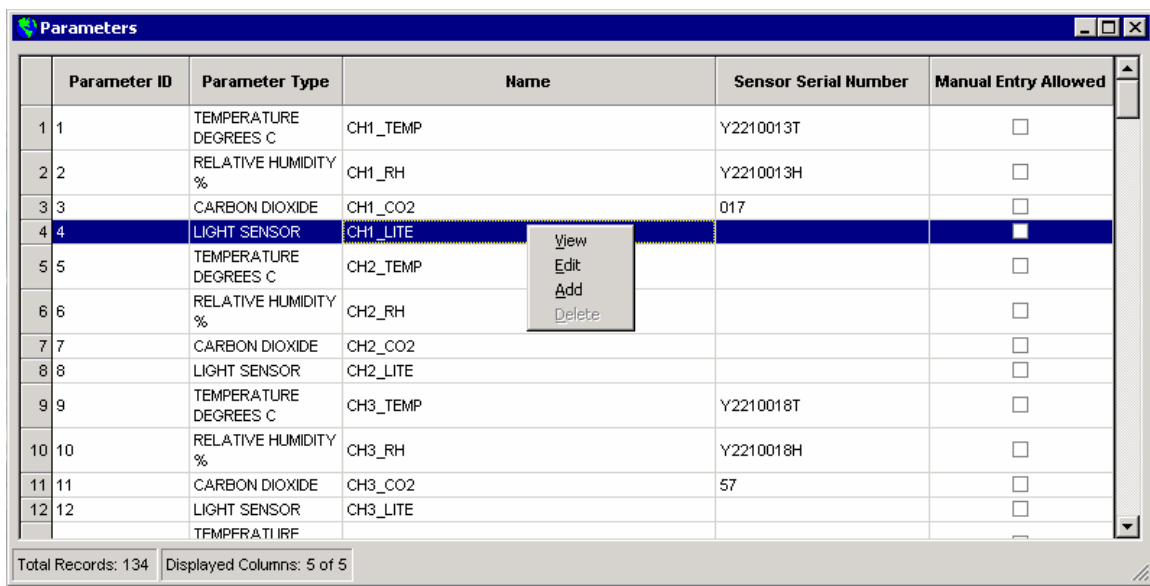


The 'Experiment Parameters' form is a window titled 'Experiment: ENV042'. It has three tabs: 'Experiment', 'Other Apparatuses', and 'Parameters'. The 'Parameters' tab is active, showing a table with four columns: 'Parameter Name', 'Parameter Type', 'Sensor Serial Number', and an unlabeled column. The table contains four rows of data.

	Parameter Name	Parameter Type	Sensor Serial Number	
1	CH3_CO2	CARBON DIOXIDE	57	WMA-4
2	CH3_LITE	LIGHT SENSOR		
3	CH3_RH	RELATIVE HUMIDITY %	Y2210018H	VAISALA H
4	CH3_TEMP	TEMPERATURE DEGREES C	Y2210018T	VAISALA H

Figure 6. Experiment Parameters Form

Going to the *Experiment Menu* and selecting *Parameters* brings up the form shown in Figure 7. Parameters. Right clicking on the form brings up a menu that allows parameters to be viewed, edited or added to the CMDS system.



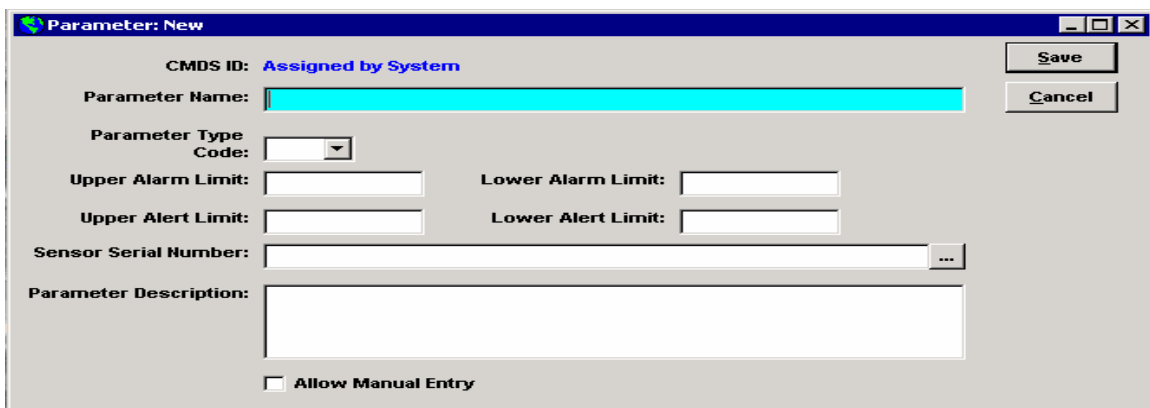
The 'Parameters' form is a window titled 'Parameters'. It displays a table with five columns: 'Parameter ID', 'Parameter Type', 'Name', 'Sensor Serial Number', and 'Manual Entry Allowed'. The table lists 12 parameters. A right-click context menu is visible over the table, showing options: 'View', 'Edit', 'Add', and 'Delete'.

	Parameter ID	Parameter Type	Name	Sensor Serial Number	Manual Entry Allowed
1	1	TEMPERATURE DEGREES C	CH1_TEMP	Y2210013T	<input type="checkbox"/>
2	2	RELATIVE HUMIDITY %	CH1_RH	Y2210013H	<input type="checkbox"/>
3	3	CARBON DIOXIDE	CH1_CO2	017	<input type="checkbox"/>
4	4	LIGHT SENSOR	CH1_LITE		<input checked="" type="checkbox"/>
5	5	TEMPERATURE DEGREES C	CH2_TEMP		<input type="checkbox"/>
6	6	RELATIVE HUMIDITY %	CH2_RH		<input type="checkbox"/>
7	7	CARBON DIOXIDE	CH2_CO2		<input type="checkbox"/>
8	8	LIGHT SENSOR	CH2_LITE		<input type="checkbox"/>
9	9	TEMPERATURE DEGREES C	CH3_TEMP	Y2210018T	<input type="checkbox"/>
10	10	RELATIVE HUMIDITY %	CH3_RH	Y2210018H	<input type="checkbox"/>
11	11	CARBON DIOXIDE	CH3_CO2	57	<input type="checkbox"/>
12	12	LIGHT SENSOR	CH3_LITE		<input type="checkbox"/>

Total Records: 134 Displayed Columns: 5 of 5

Figure 7 Parameters

If *Add* is selected an entry form is displayed as in Figure 8. Parameter Entry Form.



The 'Parameter Entry Form' is a window titled 'Parameter: New'. It contains several input fields and buttons. The 'CMDS ID' is 'Assigned by System'. The 'Parameter Name' field is highlighted in cyan. The 'Parameter Type Code' is a dropdown menu. There are four alarm limit fields: 'Upper Alarm Limit', 'Lower Alarm Limit', 'Upper Alert Limit', and 'Lower Alert Limit'. The 'Sensor Serial Number' field has a search button (...). The 'Parameter Description' is a large text area. At the bottom, there is a checkbox for 'Allow Manual Entry'.

Figure 8. Parameter Entry Form

The Parameter Name is the only required field, the alarm limits are implemented on the Experiment Setpoint Entry Screen and are not functional here (and will be removed shortly).

Parameters that are manually collected and entered into the system will require the *Allow Manual Entry* checkbox selected.

Selecting *Alarms* at the *Experiment* Menu brings up the Alarm screen. Right clicking on the screen brings up a menu allowing one to View, Edit or Add Alarms. Add brings up the blank form shown in Figure 9. Add Alarm Form.

	Alarm Parameter Name	Parameter Type	Alarm Description
1	CH1_CO2	CARBON DIOXIDE	
2	CH1_RH	RELATIVE HUMIDITY %	
3	CH1_TEMP	TEMPERATURE DEGREES C	
4	CH10_CO2		
5	CH10_RH		
6	CH10_TEMP		
7	CH11_CO2		
8	CH11_RH		
9	CH11_TEMP		
10	CH12_CO2		
11	CH12_RH		
12	CH12_TEMP		
13	CH13_CO2		
14	CH13_RH		

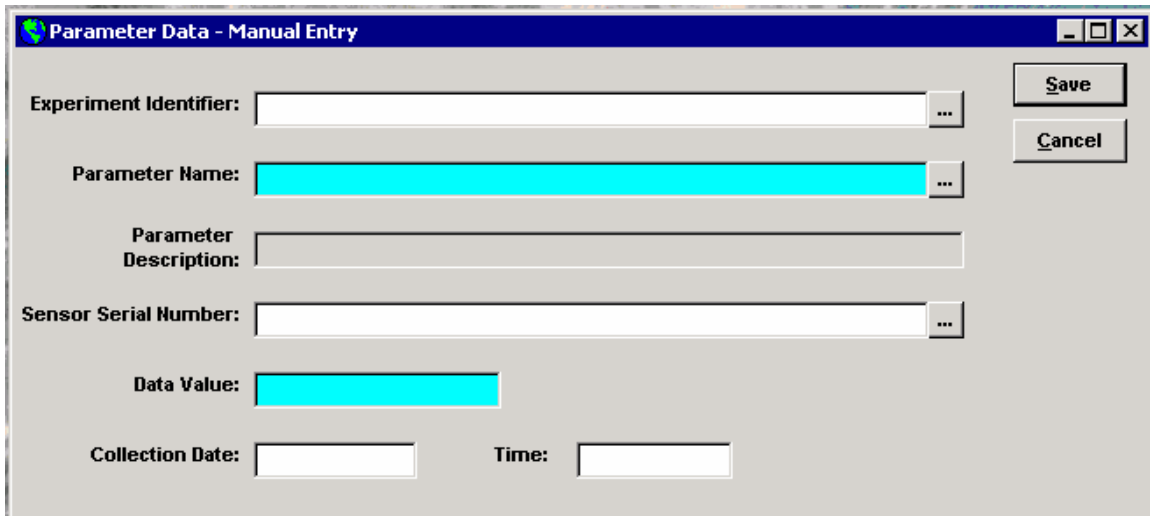
Total Records: 72

Alarm: New
Alarm | Notification List | Alarm/Alert Log
ID: **Assigned by System**
Experiment Identifier:
Parameter:
Parameter Description:
Upper Alarm Limit: Lower Alarm Limit:
Upper Alert Limit: Lower Alert Limit:
Alarm Description:
Save Cancel

Figure 9. Add Alarm Form

The Add Alarm Form allows an alarm to be defined by selecting a parameter and then selecting the Notification List, personnel can be added to the alarm. Options exist for phone, emergency phone, email, display or audible alert. At this time only the email option is functional. Selecting *Alarm/Alert Log* will display a list of all alarms for that parameter during that experiment. Alarm Limits are not functional here (and will be removed shortly).

Selecting Manual Data Entry back at the Experiment Menu brings up the Parameter Data – Manual Data Entry Form. This form is shown in Figure 10. The Parameter Name and Data Value are currently the only required fields, but collection date and time will be soon.

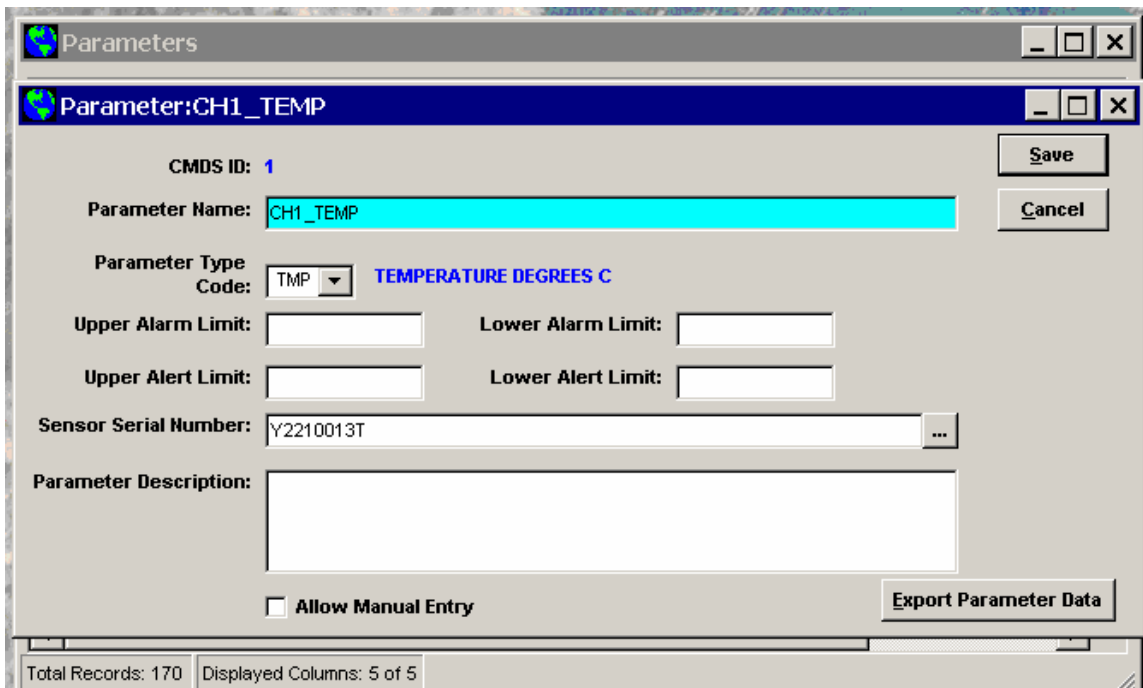


The dialog box titled "Parameter Data - Manual Entry" contains the following fields and controls:

- Experiment Identifier:** A text input field with a browse button (...).
- Parameter Name:** A text input field with a browse button (...).
- Parameter Description:** A text input field.
- Sensor Serial Number:** A text input field with a browse button (...).
- Data Value:** A text input field.
- Collection Date:** A date input field.
- Time:** A time input field.
- Buttons:** "Save" and "Cancel" buttons are located in the top right corner.

Figure 10. Manual Data Entry Form

Parameter data can be retrieved from the database by right clicking on the parameter and selecting "EDIT". This will bring up the parameter edit form with a "Export Parameter Data" button.



The "Parameter Edit Form" dialog box displays the following information and controls:

- CMDS ID:** 1
- Parameter Name:** CH1_TEMP
- Parameter Type Code:** TMP (dropdown menu) with the label "TEMPERATURE DEGREES C".
- Upper Alarm Limit:** A text input field.
- Lower Alarm Limit:** A text input field.
- Upper Alert Limit:** A text input field.
- Lower Alert Limit:** A text input field.
- Sensor Serial Number:** Y2210013T (with a browse button ...).
- Parameter Description:** A large text area.
- Buttons:** "Save" and "Cancel" buttons are in the top right. "Export Parameter Data" is in the bottom right.
- Checkbox:** "Allow Manual Entry" is located at the bottom left.
- Status Bar:** Shows "Total Records: 170" and "Displayed Columns: 5 of 5".

Figure 11. Parameter Edit Form

Selecting the button will bring up a form with two calendars; the start and end date/time. When the start and end has been entered, select "Export Parameter Data" and the data will be on the clip board ready to be pasted into an Excel spread sheet. Use "Text to Columns" under "Data" to convert the column to your data and a date time stamp.

Parameters

Select Date/Time Range for Parameter CH1_TEMP

From:

June 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Time: 12:00 AM

To:

June 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Time: 12:00 AM

Export Parameter Data Cancel

Total Records: 110 Displayed Columns: 6 of 6

Figure 11. Export Parameter Data